
FAA-C-2454
March 19, 1970

# DEPARTMENT OF TRANSPORTATION
# FEDERAL AVIATION ADMINISTRATION SPECIFICATION

## FACILITY SITE PREPARATION

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## SECTION 1-1

## SUMMARY OF WORK

1-1.1 Scope.- This specification provides the contractor with the criteria for the onsite work required in providing "turnkey" facilities for the agency air traffic control, communications, and navigational aid functions. This effort will consist of the preparation of the site, installation of all utilities and ancillary equipments as specified in the applicable facility construction specification.

1-1.1.1 Facility types.- The types of "turnkey" facilities which this specification is applicable to, methods and types of construction will be specified in the construction specifications provided with the Invitation for Bids. These facilities may be built-in-place, metal, concrete, wood, or masonary, or may be transportable, prefabricated at the plant, and assemble or constructed at the site with or without electronic equipments installed as called for in the Invitation for Bid.

1-1.2 Applicable documents

1-1.2.1 Documents.- The following FAA specifications, drawings, standards, and Federal specifications of the issues specified in the Invitation for Bids, form a part of this specification and are applicable to the extent specified herein.

1-1.2.1.1 FAA specifications

| | |
|---|---|
| FAA-C-95 | Driveway Construction, Gravel Surfaced |
| FAA-C-1244 | Installation of Engine-Generator and Fuel Tanks |
| FAA-1391 | Installation and Splicing of Underground Cable |
| FAA-E-2065 | Fences |

1-1.2.1.2 Federal specifications

| | |
|---|---|
| SS-A-281b | Aggregates |
| SS-T-310 | Tile, Drain Clay |

1-1.2.1.3 FAA drawings

| | |
|---|---|
| D-4780 | Radar Handhole and Duct Details |

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|---|---|
| D-4863-1 | Standard Underground Handholes Construction Details |

1-1.2.1.4 Other publications.- The following publications, of the issues in effect on the date of the Invitation of Bids, form a part of this specification.

| | |
|---|---|
| ASTM A 48 | Specification for Gray Iron Castings |
| ASTM A 615 | Specification for Deformed Billet Steel Bars for Concrete Reinforcement |
| ASTM C 32 | Specification for Sewer Brick |
| ASTM C 39 | Standard Method for Test for Compressive Strength of Molded Concrete Cylinders |
| ASTM C 141 | Specification for Hydraulic Hydrated Line for Structural Purposes |
| ASTM C 150 | Specification for Portland Cement |
| ASTM C 444 | Specification for Perforated Concrete Pipe |
| AASHO M 45 | Mortar Sand |
| AASHO M 17660 | Porous Concrete Pipe |
| AASHO T 99 | Moisture -- Density Relations of Soils |

(Copies of this specification and other applicable FAA specifications and drawings may be obtained from the Contracting Officer in the Federal Aviation Administration Office issuing the Invitation for Bids. Requests should fully identify material desired, i.e., specification, amendment, and drawing number and date. Requests should cite the Invitation for Bids or contract involved or other use to be made of the requested material.)

(Copies of ASTM publications may be obtained from the American Scoiety for Testing and Materials, 1916 Race Street, Philadelphia, Pa.)

(Copies of AASHO Specifications may be obtained from the American Association of State Highway Officials, 341 National Press Building, Washington, D. C. 20004.)

(Information on obtaining copies of Federal specifications and standards may be obtained from General Services Administration offices in Washington, D. C., Seattle, San Francisco, Denver, Kansas City, Chicago, Atlanta, New York, Boston, Dallas, and Los Angeles.)

1-1.3 General requirements

1-1.3.1 Work to be accomplished.- The contractor shall furnish all plant, labor, material, equipment, and transportation necessary to complete all onsite work for the "turnkey" facility as specified by the IFB. Elements of work are as follows.

a. Clearing, excavation, filling, grading, seeding.
b. Driveway, parking surfaces, culverts, and fences.
c. Underground duct and conduit handholes.
d. Power cable installations.
e. Electronic cable installations.
f. Storm drainage
g. Sanitary sewage system.

All of these elements are not necessarily required for each facility. The elements of work to be accomplished are called for in the IFB.

1-1.3.2 Site.- Any special conditions that pertain to the specific site for which this specification is used will be provided in the form of an addendum or an appendix to the specification.

1-1.3.3 Construction limits and access.- The contractor, after inspection of the site, in cooperation with the Contracting Officer's Authorized Representative, shall define the construction limit lines and approach route to the site. Limit lines shall indicate boundaries for storage areas, drives, temporary structures, parking, etc. The contractor shall coordinate his work methods and schedules with the Contracting Officer's Authorized Representative to cause a minimum of interference with, disruption, or interuption of airport operations or operations of existing government facilities.

1-1.3.4 Government furnished materials.- Requirements are covered in Clause 27 of Additional General Provisions, Standard Form 23-A, contained in the IFB.

## SECTION 1-2

## SAMPLES, TEST, AND REPORTS

1-2.1 Scope

1-2.1.1 General.- This section covers the requirements for furnishing samples, certificates of compliance, test, shop drawings, as-built drawings, manuals, utility survey, and related items to the Contracting Officer's Authorized Representative for testing, selection, and approval.

1-2.2 Submittals

1-2.2.1 Approval.- Samples, certificates, test reports, and shop drawings shall be submitted, prepaid and in ample time for proper action by the Government before materials, which

samples, certificates, and reports represent, are delivered at the site. The time necessary for Government approval of samples, certificates, test reports, and shop drawings shall be as indicated in the IFB. All materials installed in the work shall match the approved submittals. After a submission by the Contractor has been approved, no substitution will be permitted without written approval by the Contracting Officer.

1-2.2.2 Samples, certificates, and test reports.- Unless otherwise directed by the Contracting Officer's Authorized Representative, the Contractor shall submit samples, in duplicate, of the number stated in the sections, in sufficient size and/or quantity as required to perform the tests called for. Each sample shall be accompanied by the manufacturer's certificate of compliance or certified test reports, in triplicate. Properly label each sample with name and quality of the material, manufacturer's name and brand, name of project, Contractor's name and date of submission. Drawings and schedules shall be checked and coordinated with the work of any other trade involved before they are submitted for approval, and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings shall be complete, assembled in sets and shall bear:

Date
Number of drawing or revision
Name of project or facility
Name of Contractor and Subcontractor
Clear identity of contents and location of work

1-2.2.3 Submissions.- Samples, certificates of compliance, tests, and test reports, guarantees, etc. shall be submitted as follows:

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|---|---|
| Section 2-2 Earthwork | |
| Compaction tests | paragraph 2-2.5 |
| Section 2-3 Footing Drains | |
| Certification | paragraph 2-3.5.1 |
| Section 2-4 Asphalt Paving | |
| Certificates | paragraph 2-4.5.1 |
| Density tests | 2-4.5.2 |
| Sampling | 2-4.5.3 |
| Section 2-5 Lawns | |
| Samples, Analysis and Tests | paragraph 2-5.6.1 |
| Conditional Approval | 2-5.6.2 |

| | |
|---|---|
| Section 2-6 Storm Drainage and Sanitary Sewer | paragraph 2-6.6.1 |
| Section 3-1 Concrete | paragraph 3-1.12.1 |

1-2.3 As-Built Drawings, Maintenance Manual, Utilities Survey

1-2.3.1 As-built drawings.- During the progress of the work, the Contractor shall keep on file two complete and separate sets of prints on which shall be accurately and promptly noted, as the work progresses, any changes, revisions or additions to the general construction work, site work. At the completion of the work, the Contractor shall submit two sets of the "as-built" drawings to the Contracting Officer.

1-2.3.2 Maintenance manuals.- The Contractor shall provide a complete set of manufacturers' catalogs, instructions, and other similar data, including the necessary photographic cuts, diagrams, valve charts, and the like covering all mechanical and electrical devices.

## SECTION 1-3

## TEMPORARY FACILITIES, PROTECTION, AND CLEAN UP

1-3.1 Temporary toilets

1-3.1.1 Requirement.- The Contractor shall provide adequate temporary toilet accommodations, including water supply, for all persons employed on the work, located where approved by the Contracting Officer's Authorized Representative. The accommodations shall be proper enclosures and shall be maintained in proper, safe and sanitary conditions in accordance with local codes and be suitably heated when required.

1-3.2 Temporary water supply

1-3.2.1 Source.- The Contractor shall make his own arrangements for the use of water during construction. Cost for use of water shall be borne by the Contractor.

1-3.2.2 Distribution.- The Contractor shall arrange for all temporary connections as required including piping, fittings, and valves. The Contractor shall provide all necessary hose, water barrels and similar equipment as required for use by the various trades.

1-3.3 Temporary light and power

1-3.3.1 Source.- The contractor shall arrange for, provide and maintain all temporary electric light and power as required throughout the work. He shall pay all costs for the installation and use of such temporary light and power.

1-3.3.2 Distribution.- The Contractor shall provide all supply lines for light and power, extension outlets, extension cords, trailers, receptacles, bulbs, fuses and other equipment required for safety and for proper execution of the work, and for inspection purposes.

1-3.4 Temporary heat

1-3.4.1 Requirements.- The Contractor shall provide sufficient temporary heat as follows.

1-3.4.1.1 As necessary to protect all work, materials and equipment against injury from dampness and cold.

1-3.4.1.2 At all times during the placing, setting and curing of concrete in accordance with ASTM C 150.

1-3.4.2 Heaters.- The Contractor may use smokeless unit heaters (Underwriters', Factory Mutual and Fire Marshal approved) of type approved by the Contracting Officer's Authorized Representative until the structure is enclosed. Kerosene, fuel oil, or coke burning salamanders shall not be used.

1-3.5 Temporary hoists, chutes, derricks, scaffolds, etc.

1-3.5.1 Requirement.- The Contractor shall furnish and maintain all equipment, such as temporary hoists, chutes, derricks, scaffolds, stairs, ramps, runways, ladders and similar items required for the proper execution of the work.

1-3.5.2 Vertical transportation.- No materials, rubbish or debris shall be permitted to drop free, but shall be moved by the use of the material hoist, rubbish chute or other method approved by the Contracting Officer's Authorized Representative. Hoists and chutes shall be erected so as to prevent damage, staining or marring of any permanent work.

1-3.6 Construction sign

1-3.6.1 Requirement.- The Contractor shall furnish and erect a construction sign as specified in the IFB. The sign shall be erected at commencement of work and located where directed by the Contracting Officer's Authorized Representative.

The Contractor shall maintain the sign in good condition throughout the construction period and shall remove it at the conclusion of his contract.

1-3.7 Field office

1-3.7.1 Requirement.- On the site, or immediately adjacent to it, if specified in the IFB, the Contractor shall provide a temporary office of approximately 300 sq. ft. (minimum), rectangular in shape and having a minimum nominal width of 10-feet, all on one floor for the sole use of the Government for the entire life of the contract. The building or trailer including all interior fittings and furnishings shall remain the property of the Contractor and shall be renewed by him when directed by the Contracting Officer. The structure shall be weathertight and provided with ample heat, light, air conditioning, sanitary facilities, drinking water, and a minimum of six convenience outlets. Doors and windows shall be secured with locks. Heating equipment shall maintain an inside temperature of 70°F and cooling equipment an inside temperature of 80°F at the local outdoor design temperatures.

1-3.7.2 Furnishings.- The Contractor shall supply interior funishings including a minimum of two (2) 2'-10" x 5'-0" desks with locks on drawers, six (6) chairs, two (2) legal size 4-drawer filing cabinets with locks, one (1) plan rack with sticks to hold minimum of ten sets of plans, one (1) 3'-6" x 8'-0" drawing board, one (1) 3'-6" x 8'-0" reference table, sample shelves, drinking facilities and two (2) wastepaper baskets. Phone service and other office equipment and supplies will be furnished by the Government.

1-3.7.3 Janitorial service.- All janitor service, sanitation facilites, electricity, heat and air conditioning with associated service connections shall be furnished and maintained by the Contractor during the entire life of the contract or until the removal of all facilities is requested by the Contracting Officer. The office shall be kept clean and neat and the windows washed periodically by the Contractor.

1-3.8 Protection of work site

1-3.8.1 General.- Requirements are covered in Clauses 24, 26, and 27 of Additional General Provisions, Standard Form 23-A, contained in the IFB.

## SECTION 2-1

## SITE CLEARING

2-1.1 General.- Remove and dispose of all growth and planting material and site improvements as required by the Drawings, or that fall within the lines of new structures and paving. Remove such work whether it is above, on, or below grade. Protect planting and improvements that remain.

2-1.1.1 Inspection of site.- The Contractor is responsible to carefully examine the premises to determine the extent of work and the conditions under which it must be done.

2-1.2 Clearing

2-1.2.1 General.- Carefully inspect site and submit prompt notification of any existing planting, not specifically shown or specified to be removed, that will interfere with construction operations. No such planting may be removed without specific approval.

2-1.2.2 Surface soil and growth.- Strip surface of building areas and areas to be covered, to a depth sufficient to clear grass, roots, and debris. Clear surface growth from other areas of the site that are to be left open, by scraping off or burning. Do not remove trees or large bushes in open areas unless they are shown to be removed.

2-1.2.3 Stumps and roots.- Remove to a depth of not less than 18-inches below existing grade, or finish grade where area is to be excavated.

2-1.2.4 Debris.- Remove all trash and debris that has accumulated on the site.

2-1.2.5 Improvements.- Where shown to be removed, removal is required whether improvements are above, on, or below grade. Unless a limit of depth is shown, improvements shall be totally removed.

2-1.2.6 Existing paving.- Where shown to be removed or required to be removed by new construction, removal shall be to sub-grade or to depth as directed by the Contracting Officer's Authorized Representative.

2-1.3 Dispostion of Material

2-1.3.1 General.- Unless indicated otherwise, all materials resulting from these operations shall become the property of the Contractor who shall promptly remove them from the site.

2-1.3.2 Delivery to other.- Materials and equipment so indicated shall be disposed of as directed. Carefully remove such items so as to prevent damage to them and deliver them to a location as directed. Remove plant materials with earth-ball intact around roots and secured with burlap, and with branches pruned as necessary to maintain the plant in healthy condition.

2-1.3.3 Storage for future use.- Sod, top soil approved for finished grading, and plant materials that remain in the Contractor's possession may be stored at the site for future use on the project. Top soil that is stored for reuse must be free of brush, weeds, grass, roots, stones and other material that would interfere with lawn maintenance. Any plant material must be alive and healthy at the time it is reused or must be replaced.

## SECTION 2-2

## EARTHWORK

### 2-2.1 General

2-2.1.1 Location.- Excavation, filling, backfilling, and grading shall be carried to the contours, elevations, and dimensions shown or indicated on the applicable drawings.

2-2.1.2 Protection.- All banks, slopes, and adjacent areas, not specifically excavated or graded, shall be fully protected against damage.

### 2-2.2 Excavation

2-2.2.1 General.- All material now in place, natural or artificial, including rock, boulders, rubbish, and debris, shall be removed as necessary for performance of all work under the contact. Execution shall be unclassified, and the Contractor shall include in his job price the cost of removing all the materials encountered. The results of soil borings taken within the property limits are found in the contract documents, if not, he shall make his own soil borings or probings. However, the bidder is required to examine the location of the work and determine for himself the nature of the conditions including subsoil conditions effecting the cost of the work.

2-2.2.2 Ground water.- All excavations shall be kept free of water, regardless of the elevation at which ground or flood water may be encountered. Sufficient working space shall be

provided to permit the placing, inspection, and completion of all work under the contract. Excavated material, unsuitable or not required for backfilling, or grading, shall be removed from the site. The disposal of this material shall be the responsibility of the Contractor. All materials, natural or artificial, the removal of which is deemed necessary for the performance of the contract, shall be removed to a minimum depth of one foot below the finished grades, or such other depth as the plans permit, for placement of select material for slabs on grade.

2-2.2.3 Pits and trenches.- Footing pits and trenches may be excavated to permit forming of concrete, or may be excavated to exact size of the concrete. If footing trenches are excavated to the exact size of the concrete, the sides shall be maintained to withstand sloughing during the placing of concrete. Undercutting will not be permitted. If excavations are carried below the required levels, they shall be backfilled with concrete of the class specified for footings, or the foundation shall be laid at the excavated level as directed by the Contracting Officer's Authorized Representative at no additional cost to the Government. All footings shall bear on undisturbed soil unless the foundation material is rock.

2-2.2.4 Rock excavation.- Where rock occurs and footings are indicated to rest on same, the rock shall be levelled to a clean, even, hard surface. Sloping rock for bearings shall be stepped and treated in the same manner. No footing shall be permitted to rest partly on soil and partly on rock. In the event excavation reveals potential foundation bearing surfaces of part rock and part soil, the Contractor shall remove the soil and fill the voids with concrete as specified above the elevations required.

2-2.2.5 Pilings.- Where soil conditions are encountered which are not acceptable to the direct placement of footings, pilings shall be driven. The type, number, depth, and location of these piles shall be in accordance with the foundation designs provided for the facility specified in the IFB or determined as being required by the contractor.

2-2.2.6 Inspection of Excavated Footing Surfaces.- When excavations for footings have reached the required elevations, the excavated surfaces shall be inspected and approved by the Contracting Officer's Authorized Representative before proceeding with further construction. The Contracting Officer's Authorized Representative may direct the Contractor to make soil borings in order to determine the suitability of the foundation material. The material at the required footing elevation shall be free of bentonite, alkali salts or organic silt. If the material disclosed is satisfactory to the Contracting Officer's Authorized Representative, the boring holes shall be filled with concrete of the class specified

for the footings. If the material disclosed is unsatisfactory, thus requiring further study of the foundation material, additional excavation and concrete fill, revisions to the footings, etc., the Government shall determine the nature and magnitude of the additional work to be performed by the Contractor and the contract adjusted in accordance with Clause 3 of the General Provisions to the contract.

2-2.2.7 Soil Disintegration.- When the type of soil at the footing elevation will disintegrate due to exposure to the air, and the concrete for the footing cannot be immediately placed, a minimum of two inches of concrete cover shall be placed to protect the soil from contact with the air. Allowance in the depth of the excavation shall be made in order not to reduce the thickness of the footing. The cover concrete shall be of the class specified for the footing.

2-2.2.8 Freezing.- When freezing weather is expected, excavations shall not be made to the full depth, unless footing can be placed immediately. If excavation is already at full depth, the excavation shall be protected from frost.

2-2.2.9 Pipes and duct trenches.- Excavation for water pipe, sanitary sewer pipes, storm drainage pipes, concrete ductbanks and manholes shall be carried out to lines and grades shown on the facility site layouts.

2-2.2.10 Shoring.- Excavated material suitable for backfilling shall be piled in an orderly manner, a sufficient distance from the banks of the excavation to avoid overloading and to prevent slides or cave-ins. All excavated material not required or unsuitable for backfilling shall be removed from the site. Sheeting and shoring shall be provided where required to withstand sloughing or cave-in of walls and for the protection of the work, existing utilities and structures.

2-2.2.11 Trench bottoms.- Where rock excavation is encountered, the rock shall be removed to a depth of at least four (4) inches below the required depth and backfilled with a 4" layer of sand bedding. The bottom of trenches and other excavations shall be accurately graded to provide uniform bearing and/or continuous support on undisturbed soil for all appurtenances and equipment to be installed and for each section of pipe. Unauthorized overdepths shall be backfilled with loose, granular, moist earth, thoroughly compacted. Whenever wet or otherwise unstable soil that is incapable of properly supporting the item to be installed is encountered, it shall be removed to the depth determined by the Contractor's Authorized Representative and backfilled with suitable material to the proper grade.

2-2.3 Fill and backfilling

2-2.3.1 General.- Prior to commencing fill and backfilling operations, excavated and fill areas shall be cleared entirely of concrete form work, debris. Fill and backfill shall be clean earth, free from perishable material, placed in evenly distributed layers of thickness specified herein over the entire areas; properly moistened and thoroughly consolidated by power-operated mechanical equipment to prevent subsequent seattlement. Material from other sources shall be supplied for fill and backfill when sufficient or suitable material is not available on the site. All fill and backfill shall be well graded coarse granular material free of all organic, frozen, expanding or shrinking material. Fill for seeded or sodded areas shall be brought to within 6-inches of the finished grades. In the event excavated material is not suitable or in sufficient amounts for use as fill and backfill, the Contractor shall provide from off-site sources, fill and backfill conforming to the above requirements and subject to the approval of the Government Representative.

2-2.3.2 Rocks, stones, and boulders.- Rocks, stones and boulders up to 2 cubic feet in size may be incorporated in fill areas (except within 10-feet of any structure or 5-feet of utility line or trenches for cables except that, earth only, containing stones not over 2" shall be used for the top 12" of fill. Rocks, stones and boulders shall be well distributed to eliminate any voids that may cause undue settlement or prevent proper consolidation of the filled areas.

2-2.3.3 Drainage.- Coarse fill, over footing drains, shall be clean, hard gravel, broken stone, or slag unless otherwise indicated on the drawings, and shall comply with Federal Specification SS-A-281b, Class 2, sized from #4 to 2-inches. Coarse fill under concrete floor slabs and exterior concrete equipment slabs shall be clean, hard gravel, broken stone, or slag and shall comply with Federal Specification SS-A-281b, Class 2, sized from #3 to 2-1/2 inches.

2-2.3.4 Soil condition.- Cohesive soils that have become hard or lumpy, or that have been piled and have become dry, shall be broken up and reconditioned for moisture content immediatley before use in filling or backfilling.

2-2.3.5 Compaction of fill and backfill.- Compact each layer of fill and backfill to the specified percent of maximum density obtained at optimum moisture content as specified in the current AASHO-T99 Standard Specifications for Highway Materials and Methods for Testing, as follows.

2-2.3.5.1 Fill under concrete floor slabs and on both sides of the foundation wall - 6-inch layers compacted to 95%. Prior to installing fill under floor slabs, the original soil shall be removed to provide a minimum of 12-inches of fill under the slabs. The surface of the remaining original soil shall be compacted to 95% maximum density at optimum moisture content before the fill material is placed and compacted. The last layer of fill shall be built up to an elevation slightly above the finish grades before compaction. The compacted fill surfaces shall be carefully checked for the correct elevations and profiles.

2-2.3.5.2 Fill under unpaved areas - 12-inch layers compacted to 90%.

2-2.3.5.3 Fill under pavements and sidewalks - 12-inch layers compacted to 95%.

2-2.3.5.4 Backfill - 6-inch layers compacted to 95%. Prior to commencing backfilling operations, all temporary wooden sheets, piling, planking, timbers, etc., are to be removed. Any caving of excavations, or any backfill placed before inspection is completed, shall be removed by the Contractor at his expense.

2-2.3.5.5 Compaction equipment.- Compaction equipment shall be subject to the approval of the Contracting Officer's Authorized Representative. Heavy equipment for spreading and compacting fill and backfill shall not be operated closer to walls than a distance equal to the depth of the wall below the current top of the fill. Power-operated mechanical hand tampers or vibrators shall be used between this point and the wall.

2-2.4 Grading

2-2.4.1 General.- All grading shall be done to bring the ground to the finished grade. Grade not otherwise shown shall be uniformly level or sloped between points where elevations are given, or between such points and existing grades, shaped to drain away from building walls.

2-2.4.2 Placing.- Material shall be placed in evenly distributed layers over the entire area; each layer 12" or less in depth before compaction, spread and compacted as specified. Filling for areas to be seeded, sodded, or receive planting shall be graded to 6" below finished grade.

2-2.5 Quality Assurance

2-2.5.1 Compaction tests.- The Contractor shall make the necessary compaction tests to insure that the soil is compacted to

the required density. When test results are not satisfactory, subsequent tests on recompacted areas shall be performed by the Contractor. The minimum intervals for compaction tests for each type of surface and fill shall be as follows.

2-2.5.2 Floor slab sub-base and on both sides of the foundation wall 12 tests maximum; locations to be selected by the Contracting Officer's Authorized Representative.

2-2.5.3 Roadway, parking lot, and sidewalk fill (5 tests maximum) - Locations to be selected by the Contracting Officer's Authorized Representative.

2-2.5.4 General fill areas other than above (2 tests maximum) - Locations to be selected by the Contracting Officer's Authorized Representative.

2-2.5.5 An independent soil testing laboratory shall be used by the Contractor to perform these test requirements. Test results shall be furnished to the Contracting Officer's Authorized Representative.

## SECTION 2-3

## FOOTING DRAINS

2-3.1 General.- Install footing drawings, complete, in strict accordance with this section and applicable drawings.

2-3.2 Applicable Documents.- Federal specifications and American Society for Testing and Materials Standards.

2-3.3 **Materials**

2-3.3.1 Drain tile

2-3.3.1.1 Perforated concrete pipe - ASTM C 444, standard strength non-reinforced

2-3.3.1.2 Clay drain tile - Federal Spec. SS-T-310, standard strength; requirements on absorption and saturation coefficient will be waived.

2-3.3.1.3 Porous concrete pipe.- AASHO M 17660; interlocking tongue and groove joint.

2-3.3.2 Wrappings for joints of clay drain tile shall be 18 x 14, .01 inch diameter mesh copper wire cloth strips 3" wide, with both ends locked to a 3/4" strip of 16 ounce copper.

2-3.3.3 Fill.- Fill for around and over the top of the drain pipe shall be graded coarse aggregate slag, stone, or other material which will not disintegrate, contract, or expand. Note: The fill for drainage is specified in Section 2-2, Earthwork.

2-3.4 Installation

2-3.4.1 Excavation.- Excavation for the footing drain shall follow the slope of the pipe invert, making allowance for the depth of the concrete drain bed. Bottom of the drain bed shall not be lower than the bottom of the adjacent footing. If necessary, footing bottom shall be lowered to keep drains and drain bed above bottom of footing.

2-3.4.2 Drain bed.- The bed for the drain pipe shall be an aggregate strip 6-inches wider than the pipe diameter and 3-inches thick. The bed shall have a recess to fit the pipe o.d. which will allow the pipe to rest upon the bed through the entire pipe length on the grades and alignments indicated on the facility drawing.

2-3.4.3 Drain pipe.- The interior of all pipe shall be cleaned before being laid. The pipes, except clay, shall be laid with closed joints, true to grades and alignment, with a continuous fall in the direction of the flow. Any pipe which has had its grade or joint disturbed after laying, shall be removed and relaid. Before the drain is covered, the lines shall be tested with water at atmospheric pressure to insure that there is free flow through the system. Remove any obstructions and repeat test until system is satisfactory.

2-3.4.4 Clay drain pipe.- Lay with 1/2 inch open joints and the joints wrapped with copper wire cloth.

2-3.4.5 Fill.- All footing drain pipes which have been installed shall be inspected and approved by the Contracting Officer's Authorized Representative prior to filling the trench with coarse fill. Filling around and over the pipe shall be done in layers and placed in such a manner so as not to displace the pipe. All earth and debris shall be kept out of the coarse fill. Stone or gravel shall not be dumped directly onto the pipe but shall be carefully placed in a manner which will prevent damage to the pipe. The coarse fill shall be placed to an elevation no higher than within 12-inches from the finished grade of the ground in order to allow for at least 12-inches of impervious fill material.

2-3.4.6 Termination.- Footing drains shall be connected to sumps or storm drains as indicated on the drawings.

2-3.5 Quality assurance

2-3.5.1 Certification.- Certification or catalog cuts shall be furnished the Contracting Officer's Authorized Representative substantiating compliance of the drain pipe with the material requirements.

## SECTION 2-4

## ASPHALT PAVING

2-4.1 General

2-4.1.1 Paved areas.- Paving shall be placed in areas shown on the drawings and to the elevations and grades shown.

2-4.1.2 Description.- Paving consists of a 4-inch Granular Base Course, a 1-1/2 inch (Bituminous Plant Mix) Binder Course, a 1-1/2 inch (Bituminous Plant Mix) Wearing Course, Prime Coat and Tack Coat.

2-4.2 Applicable documents

2-4.2.1 Approved State standards.- State Road and Highway Construction and Paving Standards shall apply. The Contractor shall determine the applicable State standard or specification to be used. All references to method of measurement, basis of payment, and lines and grades established by the County, State, or Government Engineer are deleted.

2-4.2.2 AASHO standards.- Current standard specifications for highway materials and methods for testing.

2-4.3 Subgrade

2-4.3.1 Preparation.- Prior to constructing the granular base course as herein specified, the subgrade shall be cleaned of all foregin substances. The upper 12-inches of subgrade shall be compacted to not less than 95% of the maximum density of optimum moisture as determined by AASHO-T99 compaction test. The surface shall be constructed to such trueness that when tested with a 16-foot straightedge it shall not show any deviation in excess of 1/2 inch. Any ruts or soft-yielding spots that may appear in the subgrade, any areas having inadequate compaction, and deviations of the surface from the requirements specified shall be corrected by loosening, removing, and adding approved material, reshaping and recompacting the affected areas to line and grade, and to the specified density requirements. Where the material

cannot be compacted to the specified density, it shall be removed and replaced with material that can be compacted to the specified density. The new material shall be compacted to meet the specified requirements.

2-4.4 Material and placement

2-4.4.1 Requirements.- The granular base course, bituminous plant mix binder course, bituminous plant mix wearing course, tack and prime coats shall meet the requirements of and be placed in accordance with the approved State standards or specifications. Maximum aggregate sizes shall not exceed the following:

| | |
|---|---|
| Granular Base Course: | 2-1/2 inches maximum |
| Bituminous Binder Course: | 1 inch maximum |
| Bituminous Wearing Course: | 3/4 inch maximum |

2-4.5 Quality assurance

2-4.5.1 Certificates.- The Contractor shall furnish certification of State compliance and/or State approval of all the materials to be furnished. Complete description of mixes, types of material and test results shall be furnished.

2-4.5.2 Density tests.- A minimum of one density test, AASHO T 99, shall be performed in each 3000 square feet or fraction thereof, of subgrade area. Locations shall be determined by the Contracting Officer's Authorized Representative. When test results indicate compaction less than 95% of maximum density at optimum moisture, the Contractor shall retest after each corrective action until the required density is achieved. An independent soil testing laboratory shall be used by the Contractor to perform these test requirements. Test results shall be furnished the Contracting Officer's Authorized Representative.

2-4.5.3 Sampling.- For the determination by the Contracting Officer's Authorized Representative of composition, compaction, and density of the pavement, the Contractor shall remove upon request and test suitable size samples of the pavement. The Contractor shall replace the pavement where samples are removed, and these replacements shall be installed by the Contractor free of charge. If the deficiency in composition and compaction exceeds the limits of toleration from that specified, satisfactory corrections shall be made.

## SECTION 2-5

## LAWNS

2-5.1 General.- The Contractor shall seed and mulch all filled area, trench lines and areas otherwise disturbed during construction operations or called for on the site plan. All areas shall be restored as nearly as possible to original conditions.

2-5.2 Seeding.- Seeding shall be performed as follows:

(1) All areas to be seeded shall be graded and top soil supplied to, at least, a depth of 3" inches when the areas are brought to finished grade. In the event the quantity of topsoil removed and stored during excavation operations is inadequate to cover seeded areas to the minimum 3" depth, the Contractor shall secure additional topsoil from other sources.

(2) The soil shall then be loosened and raked and commerical fertilizer of 10:6:4 formula shall be applied evenly to the surface at the rate of 10 lbs. per 1000 sq. ft. and worked into the top 2" inches of the soil.

(3) Before sowing grass seed, the ground must be reasonably smooth, friable and of uniform texture. Seed shall not be sown when the soil is muddy, baked hard or when the wind is blowing so strongly as to prevent even distribution. Seed shall be of the following mixture, and shall be sown at the rate of 4 lbs. per 1000 sq. ft.

50% Kentucky Bluegrass
15% Perennial Rye grass
20% Alsike Clover
15% Hairy Vetch

All seed shall be furnished in separate varieties, bagged and tagged and shall be mixed at the jobsite.

(4) Seed shall be evenly sown, lightly rake into the top one-quarter inch of soil and rolled lightly with a lawn roller. If the weather is dry, the Contractor shall sprinkle the surface seeded until an even dense growth of grass over the seeded area is started.

2-5.3 Mulching.- Mulching must be performed within 24-hours after sowing of seed. Mulch material (Hay, straw or other approved material) shall be anchored in a manner approved by the Contracting Officer's Authorized Representative.

2-5.4 Maintenance.- The Contractor shall maintain the seeded and mulched areas until final acceptance of the work. Maintenance shall consist of providing protection against traffic and repairing of any areas damaged by wind, water, erosion, fire and other causes.

2-5.5 Limitations.- Seed shall not be sown when the ground is frozen or after the month of November unless approved by the Contracting Officer's Authorized Representative.

2-5.6 Quality assurance

2-5.6.1 Samples, analyses and tests.- Samples and certified analyses of a recognized laboratory shall be submitted by the Contractor at his own expense for approval by the Contracting Officer's Authorized Representative for grass seed and mulch before delivery to the site. Manufacturer's certified analysis for Standard Products will be acceptable in lieu of laboratory tests subject to the approval of the Contracting Offficer's Authorized Representative.

2-5.6.2 Conditional approval.- Approval of samples shall not be construed as final acceptance. The Government reserves the right to take samples of the materials delivered to the site and have them analysed for comparison with the requirements. Material delivered which does not comply with the requirements shall be rejected and shall be removed from the site by the Contractor.

## SECTION 2-6

## STORM DRAINAGE & SANITARY SEWER

2-6.1 General.- This Section covers the storm drainage and sanitary sewage systems including appurtenant structures completed.

2-6.2 Materials

2-6.2.1 Pipe for storm drains.- Pipe for storm drains shall be reinforced concrete pipe conforming to Specification FAA-C-95.

2-6.2.2 Pipe for sanitary system.- Pipe for sanitary sewer shall be service weight cast iron soil pipe from five (5') feet outside of the building walls, and extra heavy duty within five feet (5') of the building and below and within five feet (5') of paved areas.

2-6.2.3 Cement stablized sand.- One sack of cement per ton of sand.

2-6.2.4 Concrete and reinforcing steel.- Concrete and reinforcing steel shall conform to the requirements under Section 3-1.

2-6.2.5 Brick for manholes and inlets.- Brick made from clay or shale shall meet ASTM Specification C32, Grade NA, except that not more than 16% maximum individual brick absorption will be permitted.

2-6.2.6 Cast iron.- Cast iron for manhole frames and covers shall conform to the shape and dimensions shown on the drawings and shall be clean, and perfect, free from sand or blow holes or other defects. Holes in cover must be free from plugs and shall be clean. Bearing surfaces of manhole frames and covers are to be machined so that even bearing may be had in any position in which manhole cover is seated in the frame. Cast iron shall conform to ASTM Specification A 48 for Class 20 Gray Cast Iron.

2-6.2.7 Mortar.- Mortar shall be composed of one part by volume of portland cement and two parts of sand. Hydrated lime may be added to the mixture of sand and cement in an amount equal to 20% of the volume of cement used. Sand shall conform to AASHO Standard M 45. Hydrated lime shall conform to ASTM Standard C 141. The quantity of water shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of injurious acids, alkalies and organic impurities. The mortar shall be used within 30 minutes from the time the ingredients are mixed with water.

2-6.2.8 Area inlet grate and frame.- 24-inch by 36-inch cast iron grate, R-4842; cast iron frame, R-4899; Neenah Foundry Co., or approved equal.

2-6.2.9 Curb inlet.- 18-inch by 30-inch, light duty cast iron lid and frame; R-1879-B4; Neenah Foundry Co., or approved equal.

2-6.2.10 Manhole cover.- 24-inch inside diameter; R-1394; Neenah Foundry Co., or approved equal with Type "C" checkered top.

2-6.3 Trenching and bedding for storm drains and sanitary sewer.- Excavation of trenches, bedding, and backfilling for storm drains and sanitary sewer shall be in accordance with Section 2-2 Earthwork.

2-6.4 Installation of pipe.- Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment shown on the Drawings. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe

shall be laid when trench conditions or weather are unsuitable for such work. Full responsibility for the diversion of drainage and for dewatering of trenches during construction shall be borne by the Contractor. All pipe in place shall have been approved before backfilling.

2-6.4.1 Pipe laying.- Pipe laying shall proceed upgrade with the tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

2-6.5 Drainage structure construction

2-6.5.1 Manholes.- Manholes will be constructed at locations shown on the plans, and of the type and depth indicated thereon. Each manhole shall be constructed in strict accordance with detail drawings. Manholes may be constructed of either precast concrete or of brick. Where brick is used in the construction of manholes, every fifth course of brick shall be laid in such a manner as to effect a tie between such course and the courses immediately thereunder. In general, the long axis of the tie course will be perpendicular to the long axis of the preceding four courses.

In the construction of manholes on pipe sewers, the concrete foundation for manholes shall be placed as soon as practicable after the sewer is complete through the manhole location. This base shall be of the shape and size required for the particular type manhole. One-half inch mortar joints shall be used in brick work. Joints shall be struck flush on inside of manhole. The outside of brick manholes shall be plastered with one-half inch mortar cover. This mortar cover shall be carried up with the brick work. All mortar shall be prepared in accordance with paragraph 2-6.2.7.

Where inlet leads, main or lateral pipe sewers enter manholes, pipes shall be cut off flush with inside of manhole and any irregularities shall be painted up with mortar. Brick shall be thoroughly wet immediately before using.

After the masonry work has been completed to the proper elevation, the cast iron manhole cover frame shall be set in a full mortar bed and adjusted to the elevations shown on the Drawings.

The inverts of the sewer line or several sewer lines entering the manhole at or near the flow line elevation of the manhole shall be shaped and routed across the floor of the manhole, using mortar to obtain the proper contour.

The space excavated around manhole locations shall be back filled as specified above.

2-6.5.2 Inlets.- Inlets shall be constructed to the line and grade and at the locations shown on the Plans. All dimensions of inlets shall be in strict accordance with the Drawings. The box section of inlets may be constructed of precast concrete or of brick. Brick inlets shall be plastered with 1/2 inch mortar on inside. The walls for brick inlets shall be a minimum of 8-inches thick. Regardless of materials used for the box section, the floor slab and beam for the inlet shall be Type I concrete as specified in ASTM C-150. All inlet leads shall be neatly cut off at the inside face of inlet wall and pointed up with mortar. In general, forms will be required for both the outside and inside faces of inlet walls; however, if the nature of the material excavated for the inlet is such that it can be hand-trimmed to a smooth vertical face, the outside forms may be omitted when such ommission is approved by the Contracting Officer's Authorized Representative.

When the box section of the inlet has been completed, the floor of the inlet shall be shaped by filling with mortar to conform to the sections shown on the Drawings.

2-6.6 Quality assurance

2-6.6.1 Test for displacement of sewer and storm drains.- Sewer mains and storm drains will be checked by the Contracting Officer's Authorized Representative to determine whether any displacement of the pipe has occurred after the trench has been backfilled to 2-feet above the pipe and tamped as specified. The test will be as follows: A light will be flashed between manholes and inlets, or if the manholes and inlets have not as yet been constructed, between the locations of the manholes and inlets, by means of a flashlight or by reflecting sunlight with a mirror. If the illuminated interior of the pipe line shows poor alignment, displace pipe, or any other defects, the defects as designated by the Contracting Officer's Authorized Representative shall be remedied by the Contractor at no additional expense to the owner.

## SECTION 2-7

## SITE UTILITIES

2-7.1 General.- The contractor shall furnish all equipment, labor, and materials to provide or obtain all utilities, (power, water, gas, heat, and sanitary) to the specified facility. He shall be responsible for the installation and connection of all utilities from the nearest source as approved by the Contracting Officer's Authorized Representative. All permits, site access clearances, and coordination required for personnel and equipment access shall be his responsibility.

2-7.1.1 Site inspection.- He shall carefully examine the site and the adjacent utilities to determine the extent of work and conditions under which it must be done. He is responsible to establish liaison with the public utility companies and state, municipal functions pertaining to the installation of the utilities.

2-7.2 Installation

2-7.2.1 General.- The contractor is responsible to install all utilities in accordance with local and national codes. Preparation of the site, earthwork, and seeding, etc. shall be as specified in Section 2 of this specification.

2-7.2.2 Construction.- Installation of the utilities shall be to the depths and limits as shown on the site drawings. Types of materials for the power, water, gas, and heat shall be as specified in the appropriate facility drawings, specifications and other sections of this document.

2-7.2.3 Telephone.- The installation of underground telephone lines, ducts, or conduits shall be in accordance with the requirements of the local telephone company at those locations shown on the site drawings as approved by the Contracting Officer's Authorized Representative.

2-7.3 Utility survey

2-7.3.1 Utility layouts.- Upon completion of the contract, the Contractor shall furnish to the Contracting Officer an accurately dimensioned survey, showing the location and elevation of all utility lines (water, gas, electric, sewer, steam, etc.) including valves, connections and changes in direction, installed under the contract within the contract limits and outside the building walls. The point where utility lines emerge from the building shall be located from the building corners. The points where the utility lines leave the property shall be located from lot monuments. The survey shall be made to scale and drawn by a method which will provide a permanent reproducible record as approved by the Contracting Officer's Authorized Representative.

## SECTION 2-8

## MISCELLANEOUS SITE WORK

2-8.1 General.- This section covers the placing of fencing and the construction of roadways and parking lots.

2-8.2 Fencing.- The FAA has a requirement to construct fencing at several types of facilities. These fences provide security for the facility or may encompass elements of the facility, such as a tower or high voltage cubical providing protection to the general public.

2-8.2.1 Construction.- Fencing shall be placed as shown on the site layout drawings. The type and methods of construction shall be in accordance with Specification FAA-E-2065 as specified in the IFB.

2-8.3 Roadways and parking lots

2-8.3.1 General.- The site preparation effort may require the construction of roadways and parking lots for FAA facilities. These roadways and parking lots shall be constructed to the grades, elevations, and dimensions shown or indicated on the applicable drawings.

2-8.3.2 Construction.- They shall be constructed in accordance with Specification FAA-C-95: Driveway Construction, Gravel Surfaces. Where a bituminous surface is required, it shall be in accordance with Section 2-4 of this specification.

## SECTION 3-1

## CONCRETE

3-1.1 General

3-1.1.1 Requirements.- The work covered by this Section consists of furnishing all plant, labor, materials, tools, equipment, appliances, and services required to manufacture, deliver, furnish, and install concrete and cement work, and related work, complete in strict accordance with this Section and the applicable drawings.

3-1.2 Materials

3-1.2.1 Concrete.- Concrete for handholes, duct envelopes, culverts, and headwalls shall conform to ASTM C 150 Type I. Type III, High Early Strength, may be used with the approval of the Contracting Officer's Authorized Representative.

3-1.2.2 Reinforcing steel.- When reinforcing steel is required, deformed bars, Grade 40 or better, shall conform to ASTM A 615.

3-1.2.3 Steel conduit.- Shall conform to Specification FAA-1391.

3-1.2.4 Fiber duct.- Shall conform to Specification FAA-1391.

3-1.3 Construction

3-1.3.1 Placing concrete.- Before beginning the placement of concrete, all hardened concrete and foreign materials shall be removed from the inner surfaces of the mixing and conveying equipment. Before depositing concrete, all debris shall be removed from the space to be occupied by the concrete. Forms shall be thoroughly oiled or wetted. Reinforcement shall be secured in position and approval of inspector attained before concrete is placed. Unless otherwise directed by the inspector, water shall be removed from the space to be occupied by the concrete before concrete is deposited. Any flow of water into an excavation shall be diverted through proper side drains to a sump, or be removed by other methods which will avoid washing the freshly deposited concrete. When directed by the inspector, vent pipes and drains shall be filled by grouting or otherwise after the concrete is hardened.

3-1.3.2 Reinforcing steel.- Steel shall be placed as shown on the drawings. Concrete or metal chairs or spacers shall be used to accurately place and adequately secure the reinforcement, and concrete shall not be poured before the reinforcing has been inspected and approved by the Contracting Officer's Authorized Representative.

3-1.3.3 Concrete loading.- Concrete shall be at least seven (7) days old before loads are placed on it, steel erection is started, or backfill is started. If high-early strength Portland cement is used, the concrete shall be at least three (3) days old.

3-1.3.4 Fuel tank anchors.- Concrete fuel tank anchors shall be constructed from Class I concrete in accordance with Specification FAA-C-1244.

3-1.3.5 Handholes.- Reinforced concrete handholes shall be constructed in accordance with Drawings D-4780 and D-4863-1. Concrete shall conform to ASTM C 150 Type I. Type III, High Early Strength may be used with the approval of the Contracting Officer's Authorized Representative.

3-1.3.6 Underground duct.- Bituminous fiber ducts shall be constructed in accordance with Drawing D-4863-1 and Specification FAA-1391. The ducts shall be encased in concrete which conforms to ASTM C 150 Type I. Type III High Early Strength, may be used with the approval of the Contracting Officer's Authorized Representative.

3-1.3.7 Walks and paving

3-1.3.7.1 General.- Form edges of walks and paving against wood or metal where they are exposed. Unless otherwise shown, where surfacing abutts vertical surfaces or curbs or gutters, form against continuous strip of 1/2 inch thick compressible filler, full depth of section.

3-1.3.7.2 Contraction joints.- Unless shown otherwise, locate approximately 15-feet o.c. in both directions.

3-1.3.7.3 Expansion joints.- Use compressible filler unless shown otherwise.

3-1.3.7.3.1 Walks.- Unless shown otherwise, provide 1/2 inch wide joints, located approximately 30-feet o.c.

3-1.3.7.4 Divider strips.- Non asphaltic pre-molded joint filler, extending to the bottom of the concrete.

3-1.3.8 Concrete curbs

3-1.3.8.1 General.- Form straight sides against wood or metal. Form tapered sides and integral gutters with a metal mule constructed to required section profile.

3-1.3.8.2 Expansion joints.- Unless shown otherwise, provide 1-inch wide joints, located at end of all radius bends and 1/2 inch wide joints located at approximately 20 feet o.c. or to line with joints in walks or paving when they occur adjacent to curb. Fill joint with compressible filler shaped to the profile of the curb.

3-1.3.9 Quality assurance

3-1.3.9.1 Concrete quality.- The design of the concrete mixture shall be approved by the Contracting Officer's Authorized Representative and shall have a minimum 28-day compressive strength of 3000 lb. per sq. inch with a maximum slump of three inches when tested in accordance with ASTM C 39.

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